Issued July 18, 1910.

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF THE SCRANTON AREA, MISSISSIPPI.

ORA LEE, JR., RISDEN T. ALLEN,
AND R. A. WINSTON.

[Advance Sheets—Field Operations of the Bureau of Soils, 1909.]

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1910.

[PUBLIC RESOLUTION—NO. 9.]

JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on the field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., January 25, 1910.

SIR: Soil-survey work in Mississippi was continued during the field season of 1909 by the soil survey of the Scranton area, a part of Jackson County. This work was urged by citizens of the State and by a petition from the Pascagoula Commercial Club which bore the indorsement of the Hon. H. D. Money, Senator from that State.

I have the honor to transmit herewith the manuscript report and map covering this work and to request their publication as advance sheets of Field Operations of the Bureau of Soils for 1909, as authorized by law.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

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SOIL SURVEY OF THE SCRANTON AREA, MISSISSIPPI.

By ORA LEE, Jr., RISDEN T. ALLEN, and R. A. WINSTON.

DESCRIPTION OF THE AREA.

The Scranton area comprises 470 square miles, or 300,800 acres, in the extreme southeast corner of the State of Mississippi, or practically the south half of Jackson County. It is bounded on the north by the rest of Jackson County, on the east by Mobile County, Ala., on the south by Mississippi Sound, and on the west by Harrison County. In general it is an irregular square with an oblong consisting of 2½ townships, or 110 square miles, omitted from the northwest corner. The southern boundary is an irregular coast line.

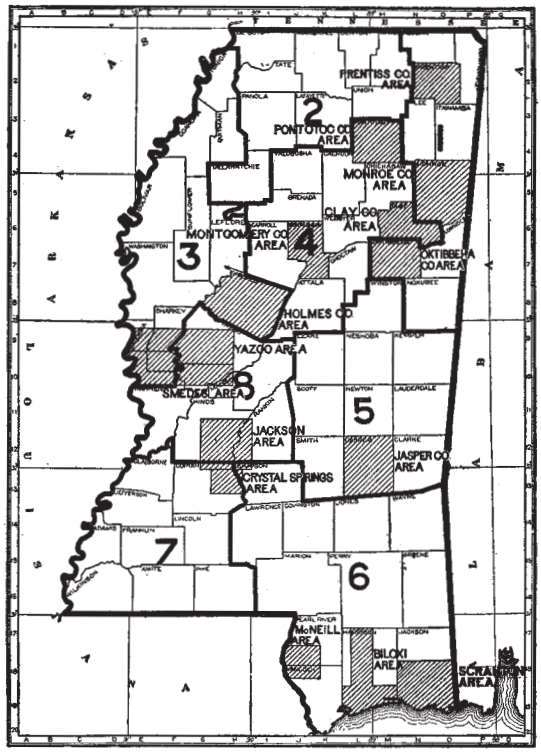

FIG. 1.—Sketch map showing location of the Scranton area, Mississippi.

In general the area has not enough relief for adequate surface drainage. The southern half is an almost level plain only a few feet above sea level. Slight elevations, some of them perhaps 8 or 10 feet above the surrounding surface, throughout this region are partially drained, and along the immediate coast tidal indentations furnish a limited relief, but in general this portion of the area is so flat and poorly drained as to be covered with water for months at a time, and the soils are consequently more or less swampy and dark colored. Toward the north, however, the topographic relief increases.

In the region around Vancleave are to be found the best-drained soils in the area. To the south and west of this locality the country presents the general appearance of a network of narrow, poorly drained depressions among slight, partially drained elevations which could easily be made islands in a maze of shallow channels by a little damming at the outlets of the larger drainage courses. East of the Pascagoula River the elevation increases gradually toward the north in a slightly undulating plain whose margins near the major streams are fairly well drained, though the body is only partially drained. The highest points in the area are northwest of Vancleave and along the northern boundary east of Wade. The highest point, near Vancleave, is only 35 feet above sea level.

The Pascagoula River divides the county into two nearly equal parts. It winds through a swamp and marsh about 4 miles wide the entire length of the area north and south. The surface of this swamp rises slightly toward the north, but is nowhere more than a few feet above the sea. Near the coast the country bordering the swamp has an elevation of less than 10 feet. Toward the north the difference gradually increases and the escarpment is more sharply eroded, in places rising abruptly to an elevation of about 30 feet—the level of the adjacent country.

The Pascagoula River, with its two main tributaries, Dog River from the east and Bluff Creek from the west, carries the drainage from more than two-thirds of the area into Mississippi Sound. Franklin Creek also receives some water from Dog River at times of high water and carries it through Alabama to the sound, so that the southeast corner of the area is entirely surrounded by water courses. The immediate coast drains directly into the sound through numerous tidal bayous. The western portion of the area is drained by Old Fort Bayou, Costapla Creek, and other streams into the Back Bay of Biloxi.

The region was first settled at an early date by French and Spanish, many of whose descendants are still here. There are also many native-born people who are descendants of the early English settlers of the southern colonies. Recently there has been a little immigration of French, Italians, and other continental Europeans. Within the last five years a number of people from the north Central States, especially Illinois and Indiana, have moved here, many of them being attracted by the mild climate.

The region is still very sparsely settled, many areas of several square miles not having a single inhabitant. Moss Point, Scranton, and Pascagoula, along the east side of the Pascagoula River south of Dog River, and Escatawpa across Dog River from Moss Point, though claiming separate identity, are all practically one so far as

settlement and interest are concerned and constitute the most thickly settled part of the area. These places and their immediate environment probably have a total population of from 7,000 to 9,000. Aside from the local mercantile trade these places are interested almost exclusively in the lumber business, there being about 25 mills in operation. Scranton is the county seat and commercial center of the county. Ocean Springs, in the southwest corner, is interested to a slight extent in the fish and oyster industry, but is known chiefly as a summer resort. The population of this town is 1,000 or 1,500 and there are a few stores to supply the local demand. Vancleave, on Bluff Creek, is a sawmill settlement and local trade center. Fontainebleau, West Pascagoula, Orange Grove, and Pecan are local stations on the Louisville and Nashville Railroad, with only one or two stores each and no particular interest or prospect of immediate development. The railroad has a creosoting plant at West Pascagoula.

The main line of the Louisville and Nashville Railroad crosses the southern part of the county, giving direct access to several large markets, including New Orleans, Mobile, Montgomery, and Birmingham, with connections in all directions at these points. The Denney and Company log road, while not a chartered passenger road, carries freight from the region east of the Pascagoula River to Moss Point, where the Pascagoula street railroad accepts it for delivery to the Louisville Railroad at Scranton. Pascagoula Port, as the mouth of the Pascagoula River is officially known, has a government-dredged channel and is at present a large lumber exporting point. It has ample natural facilities for handling water freight and will be of great advantage for marketing cotton and other bulky crops as the agriculture of the region develops. Boats drawing 6½ feet can be carried 50 miles up the river.

There are not enough garden truck and vegetables produced at present to supply the local demand. New Orleans and Mobile furnish open markets for any surplus under car lots, and for carload shipments the Louisville and Nashville Railroad furnishes convenient transportation to all points.

Not much attention has been paid to the highways. Some of the main roads have been worked so as to provide drainage and partly relieve them from standing water, while others have received no attention whatever. Oyster shells are the only hard material available in the area and the limited supply of these is all used in the coast towns. The country roadbeds consist of the native sands and other soil materials and in wet seasons are badly cut up and remain in a poor state for several months. Some interest is being shown just now in improved roads, and with the easy grades encountered throughout the area the only difficult problem is the securing of suitable materials for surfacing.

CLIMATE.

The climate is that of the warm temperate zone. The temperature is modified by the influence of the Gulf, so that the mean and absolute extremes are not as variable as farther inland. The only available climatic statistics are from the Weather Bureau station at Biloxi, just west of the area, but these should represent the conditions of the area very accurately. In only one instance since records have been kept has the temperature gone to 1° F., and this was in the season of 1899, so well remembered throughout the Southern States, particularly in the orange sections. A temperature below 15° F. is exceptional and the mean for the winter months is 52° F. The recorded maximum is 100° F. and temperatures ranging from 90° F. and 95° F. are not uncommon during the summer season. The summer mean is 81° F. and the spring and fall mean 68° F. The summers are long, the warm period often beginning in April or early in May, and continuing until October. With an occasional exception farm work can be carried on to some extent during every month of the year, and though the more tender plants can not safely be started until early in March, many of the more hardy vegetables can be produced every month in a normal year. Strawberries are not unusual at Christmas time. The season is long enough so that two crops of most vegetables can be produced on the same ground in a single season.

In the matter of rainfall the appended table shows some strikingly variable figures, ranging from 43 inches for the driest year to 89.6 inches for the wettest year, with a mean of 61.3 inches. Spring and fall have the lowest average precipitation, 13.6 inches and 12.6 inches, respectively, with winter a little higher, 15.1 inches, and summer considerably higher, with 20 inches. A striking example of the variability in different years is that June shows both the highest and lowest extremes—16.9 inches and 1.2 inches. The summer months, when crops are growing fastest and require the most moisture, are the most variable in this respect. In general it may be said that the rainfall is more than sufficient for all of the crops now grown or adapted to these soils, but its distribution is not uniform in different years and there is danger of either drought or flood at any season, and particularly from April to July, when such conditions are likely to do the most injury. However, the extensive drainage projects necessary to reclaim much of the land will afford relief in seasons of abnormal rainfall, and careful tillage with a view to the conservation of soil moisture will carry most crops through all except the most extended droughts. Proper underdrainage is also an important factor in preventing injury by drought, through its beneficial effect upon the structure and consequently upon the water-holding capacity of the

soil. There is less danger from drought than from excessive moisture, as the former is not liable to continue for so long a period, and with the heavy annual precipitation there is usually enough moisture in the subsoil to carry crops successfully for several weeks with intelligent cultivation.

The following table is compiled from the records of the Biloxi station:

Normal monthly, seasonal, and annual temperature and precipitation at Biloxi.

Month.	Temperature.			Precipitation.			Greatest depth of snow in 24 hours.
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
December	51	76	15	4.8	5.7	8.3	0.0
January	51	78	19	3.7	1.2	6.3	Trace.
February	53	76	1	6.6	6.5	9.9	6.2
Winter	52	.....	.....	15.1	13.4	24.5	.....
March	61	82	30	6.9	5.0	8.0	0.0
April	67	89	38	3.7	2.2	10.2	0.0
May	75	98	40	3.0	2.2	6.8	0.0
Spring	68	.....	.....	13.6	9.4	25.0	.....
June	80	98	60	7.0	1.2	16.9	0.0
July	82	100	65	5.5	2.2	7.3	0.0
August	81	100	63	7.5	4.8	3.4	0.0
Summer	81	.....	.....	20.0	8.2	27.6	.....
September	77	98	40	6.1	4.8	7.2	0.0
October	68	92	35	3.4	3.6	3.4	0.0
November	59	85	27	3.1	3.6	1.9	0.0
Fall	68	.....	.....	12.6	12.0	12.5	.....
Year	67	100	1	61.3	43.0	89.6	6.2

AGRICULTURE.

As late as 1880, according to the United States census, there were only 4,427 acres of improved farm land in the entire county, of which one-half was included within the limits of the present survey. The area of improved land had increased to 10,698 acres in 1890, but was only 8,239 acres in 1900. There has been a little increase and development in the last three or four years, but as yet the agriculture is quite limited. In 1880, 138 acres were planted in corn and a much smaller acreage in oats, sugar cane, hay, rice, sweet and Irish potatoes, and Canada peas. The value of all market-garden products was $620. In 1890 there were 2,498 acres in corn, and the value of

market-garden products and small fruits was $13,544. According to the census of 1900 several thousand acres were then under cultivation, an increased acreage being shown in hay crops—clover 1,042 acres and other grasses and forage crops about 800 acres. The value of miscellaneous vegetables was $10,905.

With the exception of small areas around the coast towns and along the Louisville and Nashville Railroad the earlier farming settlement was more in the northern part of the county upon higher and better drained land, so that the figures for the area surveyed would doubtless be less than one-half those for the entire county as given above. The effort of early settlers along the coast was confined to fishing and oystering, and these are still important local industries.

The entire region was originally forested with pine, and for the last twenty years, with the continuous rise of prices, interest has been centered chiefly in lumbering. Charcoal has also been produced for many years, and there are several turpentine orchards in operation at present. The marketable timber, however, is nearly gone and attention is turning more to agriculture than ever before. Some sheep have always been kept. They can live entirely on the open range of the sparsely forested areas and are still the chief source of income in some sections. A few cattle are also seen. It is doubtful if 5 per cent of the area has ever been under actual cultivation. Farming is still in the experimental stage, and is not confined to any particular system. Corn, oats, grass, Irish and sweet potatoes, and a few vegetables are the staple crops. There is a tendency toward highly specialized crops in those sections where this is feasible.

Within the last few years several highly improved varieties of pecans, developed in this section, have attracted widespread attention, and several large groves, as well as a great number of smaller ones, have been planted. There are two or three large commercial nurseries, where all the best varieties of this nut are being propagated. These have furnished the improved stock used in the county and in addition have shipped considerable quantities to outside points. The smaller hardshell nuts have been grown locally for generations, but the recent orchards of improved varieties have not been set long enough to show definitely what can be accomplished with them. The young trees seem to do well on nearly all types of soil when well drained, with a preference for deep, open textured, though not droughty types. The Norfolk fine sand is probably one of the best soils for pecans, and all of the Norfolk types except the sand appear to be satisfactory. Some of the Scranton soils will do in their present condition, and all of them and the Portsmouth types, except the clay loam, could be adapted to pecans by thorough drainage, though it is not believed that they will prove as good as the Norfolk and Scranton soils. The definite selection of the best soils for pecans can be de-

termined only after commercial orchards have reached full bearing age upon several of the types. Conservative growers figure on at least ten years to develop an orchard to a self-supporting age, even from good-sized nursery stock and with thorough tillage every year. Some trees begin to bear a little at five years, but without good care they can not be expected to yield much under fifteen years. Trees take about five years longer to develop on heavy bottom soils than on the better drained and lighter textured types. Full-grown, well-cared-for trees should yield 150 to 300 pounds of nuts a year. Under the best care such trees can be developed on some soils in twenty-five or thirty years. An acre will support from 15 to 20 trees.

Some interest has also been shown in dwarf oranges, like the Satsuma, and allied fruits, which have been found to withstand the climate for several years. Some of the trees have borne well and several small groves have been set. Others are in prospect, but the question of their commercial success is as yet unsettled and subject to a great difference of local opinion. There are several small vineyards of Scuppernong grapes. They bear well and are looked upon with favor by a number of growers. Well-drained Scranton fine sandy loam appears to be their best soil.

Cotton has just begun to attract attention in the area. A few small patches have been cultivated near Scranton, Escatawpa, and Vancleave with fair success, and it gives promise of becoming a commercial crop. The chief interest in this crop is in the vicinity of Vancleave, on the Norfolk and Orangeburg fine sandy loams.

Within the last year or two market gardening has been given some attention, more especially in the southwest part of the area in the vicinity of Ocean Springs, though to some extent all along the line of the Louisville and Nashville Railroad. It is upon this specialty as a basis that the intensive development of the area depends, especially in those sections near the railroad. The garden crops have been grown mostly in an experimental way up to this time, and very little produce has been shipped outside of the area, but the experiment has proved successful upon well-drained land. When drained, large areas will be found particularly suited to the production of certain truck crops, and especial adaptations will be pointed out in connection with the description of several soil types. Effort is being made around Ocean Springs to form a shipping association, so that these crops can be marketed in car lots by the several small producers and thus avoid the heavy cost of transportation in small lots. It is hoped by this plan to encourage an increased acreage.

A recognition of the various soil types and their adaptations to different crops would hardly be expected at the present time with the undeveloped state of agriculture. The cultivated areas have been selected more for their location near the railroad towns and local

markets. In general the elevated and better drained areas of the Norfolk and Scranton soils are preferred to soils of the Portsmouth series.

In 1900 only $10,000 was expended for farm labor in the entire county and this has not increased materially since. Both white and colored help demand $1 to $1.25 a day and board, and the labor usually requires strict personal supervision. Only a small proportion of the immigrants are attracted to farming, as they are accustomed to community life and prefer work in the mills. Some of them are engaged in the fish and oyster business.

According to the returns of the census the average size of farms decreased from 1,099 acres in 1880 to 232.3 acres in 1900. The greater part of this decrease is apparent only and the result of a difference in classification, but there is doubtless a decrease in size as a result of the development of the trucking industry. More than 91 per cent of the farms were operated by owners in 1900 and the proportion has not changed materially since that time. Several large farms lately established by individuals and companies are under the immediate direction of a salaried manager.

The price of land throughout the area is less dependent upon the character of the soil than upon location. The amount of standing timber is in many instances a controlling factor. Tracts of 25 acres or less of Norfolk fine sand near Ocean Springs with a limited beach front have sold for $100 an acre, the value being greatly enhanced by the suitable location for summer residence or by the oyster privileges along the shore. The value of such land for truck growing is also recognized. All along the Louisville and Nashville Railroad, and especially near Scranton or Ocean Springs, all soil types suitable for farming are held at prices ranging from $15 to $30 an acre. In the vicinity of Vancleave the Norfolk fine sandy loam, which is well drained and undergoing rapid development, is quoted at $20 to $30, though there are individual farms partly improved for sale at $10 to $15 an acre. Throughout the greater part of the area unimproved land with a scanty timber growth and located a few miles distant from the railroad can be had for $3 to $10 an acre. The chief factor in the variation of prices is the drainage condition. Probably one-half the land in the area can be secured at an average cost of $5 an acre, but land prices have advanced rapidly during the last few years, especially along the railroad and near Vancleave. This rise is coincident with an increasing interest in agriculture in general and especially in the growing of pecans.

Taking the area as a whole the successful development of agriculture depends primarily upon proper drainage. Only a very small proportion of the area can be said to have satisfactory natural drainage conditions. With a few exceptions the soils are not adapted to general

farming. Many of them, practically useless in their present condition, will be particularly suited to certain highly specialized crops when relieved of their excess water. Other types can be utilized to some extent in their present condition, but require drainage before they can grow successfully the crops to which they are best adapted. Still other soils require drainage only in places. These matters are treated in more detail in other chapters.

After drainage the next most important requirement is thorough tillage. Fertilizers are often necessary to successful crop production, especially in the growing of truck crops and small fruits. Deep plowing and numerous shallow but thorough cultivations, both before and after the crop is planted, are essential to the best success. The one-horse plow must be replaced with a two-horse implement turning 8 or 10 inches of soil. Improved harrows and cultivators are necessary to work this deeper turned soil into a good seed bed and to keep it in good condition throughout the growing season. The liberal use of organic matter, preferably stable manure when it can be secured and cowpeas or other legumes, or even grains and grasses, plowed under for green manure, can not be too strongly urged on all soils except the Muck and very highly organic types. They are most necessary upon the lighter colored and lighter textured soils. These substances not only add actual fertilizing material to the soil in large amounts, but also improve its structure and render it capable of holding an optimum amount of water. Soils so treated better withstand both abnormally dry and abnormally wet seasons, and also give better results from the commercial fertilizers applied.

The rotation of crops is also very important. In general it may be said that no crop should succeed itself upon the same field. It is a matter of universal experience that any crop will do better following some other than one of its own kind, and it is usually best to include in the rotation three or four different crops, so that one of them will not occupy the same land oftener than every third year at least. In general farming, for instance, a rotation including cotton, corn, oats, and hay, in the order named, is a desirable one. Cowpeas for either hay or green manure should precede the important money crop because of the beneficial effect upon the soil, resulting even from the decay of the roots and stubble when the vines are cut for hay. In the case of truck growing two or more different crops can often be produced on a field in one year, and if a particularly early crop is desired cowpeas or a grain crop, preferably the former, can follow it and be matured in time to plow under in the late fall in preparation for the next season's truck crop.

SOILS.

The area is situated in the extreme southern edge of the physiographic province of the United States known as the Gulf Coastal Plain. It begins at the coast bordering Mississippi Sound and extends inland about 22 miles. With a few exceptions the soils are derived from the Columbia formation by the usual soil-forming processes of weathering, erosion, etc. This formation is the latest exposed Coastal Plain deposit. It consists of gray and yellow unconsolidated material which in many places is so full of organic matter or stained by the products of its decay that the color is changed to a dark brown or black. In other places it is yellow. Under this formation at various depths is the Lafayette, consisting of red sandy clay. This was probably the surface material during one geologic period, but was later submerged and buried under the Columbia. It must have been exposed long enough for its surface to undergo considerable erosion, as it is now encountered at greatly varying depths, oftentimes being found only in the lower portion of deep wells, and in other places coming so near the surface as to impart a decidedly reddish tinge to the subsoil. In two places it outcrops at the surface and gives rise to a distinct soil type, the Orangeburg fine sandy loam.

Distributed throughout the southeast portion of the area in various places there is found underlying the surface material, at a depth of from 1 to 3 feet, a heavy, plastic, mottled red, yellow, and drab clay similar to the material which often gives rise to the Susquehanna soils in other parts of the Coastal Plain. The occurrence of this subsurface material is most common north of Dog River to the east of Moss Point, in a small area about 3 miles northwest of West Pascagoula, and to a less extent farther north toward Wade. It is not extensively developed, however, and most of it is not heavy enough for typical Susquehanna subsoil. The surface material does not differ greatly from that in other parts of the area and the variations were not considered important enough to map as distinct types, but have been treated as phases of other soil types.

In the Norfolk, Scranton, and Portsmouth series of this area, derived from the Columbia formation, and the Muck, Swamp, and Tidal marsh types, which altogether occupy nearly 99 per cent of the area surveyed, there is presented an excellent opportunity to study soil formation on a slowly rising coastal plain. These different soil series owe the characteristics upon which their separation is based primarily to the extent to which their drainage has been developed. Where the drainage is more fully developed the Norfolk soils are found, an intermediate condition gives types of the Scranton series, less perfect drainage the Portsmouth soils, and lack of drainage the Muck, Swamp, and Tidal marsh soils.

The Norfolk series, including a sand, loamy sand, fine sand, fine sandy loam, and loam, consists of gray and yellow surface soils underlain by yellow sands and sandy clays. The surface has been eroded sufficiently for ample surface drainage, though in some cases artificial underdrainage is desirable. The Scranton series, consisting of a sandy loam, fine sandy loam, and silt loam, is characterized by dark-colored surface soils, often quite like those of the corresponding Portsmouth types, underlain by lighter colored subsoils similar to those of the Norfolk series. In topography these soils are slightly elevated and undulating, enough to afford partial relief from surface water, though the run-off is seldom as complete as it should be, and practically the entire series requires underdrainage. In more or less all of its characteristics the Scranton series is intermediate between the Norfolk and Portsmouth. The Portsmouth soils, represented by four types, a sandy loam, fine sandy loam, loam, and clay loam, comprise types with black surface soils underlain by dark-colored subsoils with an impervious substratum of either clay or a compact sandy hardpan. The dark color is derived from organic matter, the accumulation of which is due to poor drainage and a continuously wet condition. The surface is flat or depressed, and both surface and underdrainage on an extensive scale are necessary before the land can be used for agriculture. The miscellaneous types do not differ materially from these types in other Coastal Plain areas.

The soil-forming processes are found in all stages of advancement, so that there is seen a gradation in soil conditions from the Tidal marsh at tide level on the one hand to the best drained Norfolk soils on the other. As a result the different soil series grade almost imperceptibly from one to another, and the boundaries have in most cases been established arbitrarily. In the separations, however, effort has been made to follow as accurately as possible the factors causing differences in crop adaptation.

The Norfolk and Portsmouth soils are found extensively along the Atlantic and Gulf Coastal Plain from New England to Texas. The former are among the leading farming soils of this region. In places the sandy types have been highly developed in the trucking industry, while the heavier types are the general farming soils. The Portsmouth soils have on the whole been developed to a much less extent, but the lighter types no less intensively in a few instances. The Orangeburg soils are among the strongest and best general farming soils of the Coastal Plain, but their representation here by a small area of one type is of minor importance. The Scranton series has been recognized for the first time in this area to cover the transitional stage in soil development between the Portsmouth soils and the Norfolk soils.

The names and extent of the different soil types mapped in the Scranton area are given in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Scranton fine sandy loam	50,752	16.9	Norfolk loamy sand	10,048	3.3
Norfolk fine sandy loam	45,824	15.2	Norfolk loam	7,552	2.5
Swamp	37,056	12.4	Muck	6,464	2.1
Tidal marsh	34,240	11.4	Portsmouth sandy loam	6,272	2.1
Portsmouth fine sandy loam	30,080	10	Norfolk fine sand	3,648	1.2
Portsmouth loam	20,992	7	Orangeburg fine sandy loam	3,072	1
Scranton silt loam	18,112	6	Scranton sandy loam	640	.2
Portsmouth clay loam	14,656	4.9			
Norfolk sand	11,392	3.8	Total	300,800	

NORFOLK SAND.

The soil of the Norfolk sand is a gray to light-brown or very pale-yellow, loose sand to a depth of 8 or 10 inches. There is occasionally a little organic matter on the surface and in the first 2 inches. The subsoil to a depth usually of more than 3 feet is a yellowish-gray or bright-yellow sand with occasionally enough finer material to render it slightly coherent when wet. There is often quite a high percentage of coarse sand throughout the soil section. In places a yellow light sandy clay or sticky sandy loam is encountered at about 3 feet.

The largest body of this type and the only one of much importance in the area lies along the coast of south Fontainebleau and occupies practically an island separated from the mainland by salt marsh and tide-water channels and a short stretch of swamp. There are a few small areas inland, bordering streams or swamps, the largest one being about 5 miles north of Pecan, near where Jackson Creek enters Dog River.

The large area along the coast is level, while the inland areas are rolling to slightly hilly. The loose, porous nature of the subsoil to a depth of several feet, however, makes drainage excessive even in the more level areas.

The Norfolk sand is derived from the latest exposed marine sediments and its coarse texture indicates that it was deposited by swiftly moving currents. The surface was also probably washed for a time by the beach waves on a slowly rising coast. The inland areas have received during some earlier period slight additions of sand by the overflow of adjacent streams and some of the smaller areas have been formed largely from such overflow deposits.

The native vegetation is largely longleaf pine, with some scrub oak. A low-growing palmetto is also a characteristic growth, but there is very little grass and in many places the surface is bare. Very little

of the type is now cultivated, and it is not a good soil for general farming. The loose, open structure, however, renders it easily tilled, and the fact that it is exceptionally well drained makes it one of the earliest truck soils. It is especially adapted to melons, and with proper care can be made to produce good yields of early Irish potatoes, strawberries, pease, beans, radishes, lettuce, etc. Its value is due less to the possibility of high yields than to the fact that with reasonably heavy fertilization crops of excellent quality can be matured earlier than upon any other soil and thus gain the advantage of high market prices.

The ample average rainfall of the region is of great advantage to this soil, which under less favorable conditions would suffer more from drought than any of the other soils. At least two crops of most varieties of vegetables can be grown in one season, but it will be found best in the development of the type to confine the vegetables to one very early crop and as soon as that is harvested to put the land in cowpeas, vetch, velvet beans, or some similar crop to be plowed under as a green manure in preparation for the next year's truck crop. In addition to this a heavy application of stable manure or other organic matter will be found of great benefit and more lasting in the soil than commercial fertilizers. The use of coarse organic manures is beneficial not alone through the addition of plant food, but through the increased power of the soil to hold water where such materials are supplied.

The results of mechanical analyses of samples of this type of soil are given in the following table:

Mechanical analyses of Norfolk sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20668	Soil	0.0	11.7	39.7	38.1	0.4	8.7	1.3
20669	Subsoil	.0	11.0	34.8	37.5	.6	9.9	6.3

NORFOLK LOAMY SAND.

The soil of the Norfolk loamy sand, to a depth varying from 8 to 24 inches, but averaging about 16 inches, is a light gray sand. At a depth of 10 inches it may become somewhat yellowish in color. In the smaller areas and near the boundaries with other types the coarse surface soil is not so deep and sometimes the material is more nearly a light sandy loam or loamy sand. The subsoil is a sticky sand, becoming heavier with depth and grading into a yellow sandy clay usually within 3 feet. This type is separated from the Norfolk sand mainly because of the heavier subsoil, and there are small areas

where the sand is deep enough to warrant classification as the Norfolk sand, but they are too small to be shown on a map of the scale used.

A few small areas of this soil are found. They occur throughout the region east of the Pascagoula River, the largest being almost 4½ miles long north and south and averaging less than 1 mile wide. There are also several small areas west of the river. The topography is rolling and drainage ample. Where the surface material is very coarse and loose and the heavier subsoil at considerable depth drainage is excessive.

Like the Norfolk sand the Norfolk loamy sand is a late coastal plain deposit, but with only a shallow surface layer of sand. It has been affected more by erosion than the former type, and some finer material has been removed from the surface soil. The areas have considerable topographic relief.

The native growth is largely longleaf pine, with some palmetto and a very scant growth of wire grass. It is readily distinguished from the surrounding types by a growth of scrub oak. Most of the pine has been removed, but very little of the soil is cultivated. It is not a strong general farming soil, but is superior to the Norfolk sand by reason of its heavier subsoil. It is well adapted to melons and early truck crops and will return slightly better yields than the Norfolk sand, though crops mature a few days later. The suggestions for the use of green and stable manure on Norfolk sand also applies to this soil, and the effect of commercial fertilizer in connection with them will be noticed for a longer period than on the lighter type.

The results of mechanical analyses of the soil and subsoil of the Norfolk loamy sand are given in the following table:

Mechanical analyses of Norfolk loamy sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20672	Soil	0.3	16.6	28.6	38.0	1.8	12.5	2.2
20673	Subsoil	.0	13.1	30.8	29.9	1.7	11.9	12.6

NORFOLK FINE SAND.

The surface soil of the Norfolk fine sand to a depth of about 10 inches is a loose gray, fine sand, with a very little medium sand and in places a small amount of finer material. The virgin soil in the first 3 to 6 inches usually contains enough organic matter to make it somewhat darker colored. It is slightly coherent when wet, but does not pack too hard at any time and is very easily tilled. The subsoil to a

depth of several feet is a gray or lemon-yellow material of about the same texture as the surface soil. In a few places the heavier textured yellow sandy clay is encountered below 2 feet and is of great advantage in retaining moisture, though it is not close enough to the surface to affect materially the earliness or crop adaptation of the soil.

This type is of very limited extent. It is confined to a few narrow margins along the beach and tidal channels in the vicinity of Ocean Springs and eastward. The topography is slightly rolling and drainage excellent. The material was first laid down in shallow water during recent geological times and then reworked to some extent by wave action.

The native growth indicates a strong soil. The type is or has been occupied by large, well-developed longleaf pines, hickory, magnolia, several varieties of oak, and a heavy undergrowth of shrubs, vines, and palmetto.

This is considered the best early truck soil in the area. It combines the characteristics which make possible the production of good yields of high quality vegetables at an earlier date than they can be secured on any of the other soils, with the possible exception of portions of the Norfolk sand and loamy sand, which, however, will not return as good yields. Strawberries and other berries and bush fruits also produce good yields of excellent quality. The native growth of hickory indicates the adaptation of this soil to pecans. Occasional crops of cowpeas or some other legume, to be used as green manure, and heavy applications of stable manure are recommended. In connection with these an application of high-grade fertilizer will be found profitable when cultivating this soil to truck and vegetable crops.

At the present time this type is held at the highest prices in the county. These prices are influenced by favorable situation for summer residences along the beach, and must not be taken to indicate the agricultural value of the lands as compared with other soils without this advantage of situation.

The results of mechanical analyses of soil and subsoil of the Norfolk fine sand are given in the following table:

Mechanical analyses of Norfolk fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20670	Soil	0.0	0.7	0.4	57.6	21.9	16.6	2.5
20671	Subsoil	.0	.2	.4	58.2	22.4	15.8	2.7

NORFOLK FINE SANDY LOAM.

The Norfolk fine sandy loam to a depth of 8 to 10 inches is a gray, fine sandy loam. Below this it becomes a yellow or lemon-yellow more sticky sandy loam, which grades at 18 to 24 inches into a yellow sandy clay, and at 3 feet often into a heavy clay. A minor phase has a light, coarse, sandy loam surface. In other places the first 6 inches is made considerably darker by the presence of organic matter, but when this characteristic is much developed the soil has been mapped with the Scranton series. Near the boundary with the loam the texture becomes a silty fine sandy loam on the surface and the subsoil is apt to be a silty clay.

No gravel or stones of any kind were seen east of the Pascagoula River in any of the soils, but west of the river there are areas of the Norfolk fine sandy loam, especially toward the north, which have a considerable amount of concretionary iron gravel ranging in size up to one-half inch or more in diameter, on the surface and throughout the soil section. In a few places in this type there is a slight reddish tinge to the lower subsoil derived from the influence of the closely underlying Lafayette formation.

The largest and best development of this type is around Vancleave, but it is also found in nearly all parts of the area surveyed. It occupies the better drained positions, with usually enough topographic relief to remove all excess water from the surface, though some areas east of the river are comparatively level and depend for their surface drainage upon the proximity of more depressed areas or shallow intermittent stream courses. Underdrainage, however, is but poorly established, owing to the close structure of the underlying clay subsoil, and in all areas not having ample topographic relief a system of short drainage ditches to the near-by natural channels would be very beneficial.

The Norfolk fine sandy loam has been formed, through weathering and erosion, from the yellow sandy clays of the Columbia formation Continued weathering has bleached the surface material to a pale yellow, or in many cases gray, and the heavy rainfall of the region has washed out much fine material from the surface soil, leaving the coarser sands and a small proportion of silt and clay. The native vegetation, now mostly removed, was a fair growth of longleaf and shortleaf pine. A heavy wire grass sod occupies cleared areas. Little other vegetation is seen on the type.

The Norfolk fine sandy loam is not considered a strong farming soil. Under existing conditions, however, it will probably be one of the first developed soils in the area, as it is one of the very few types covering a relatively large territory which can be utilized successfully without first providing a more or less comprehensive drainage system.

At present the chief drawback to the utilization of the type is distance from the railroad. With careful handling, including deep plowing, thorough cultivation, systematic rotation of crops, including cowpeas or some other legume at least every third year, and the liberal use of either green or stable manure or both, supplemented with conservative applications of high-grade commercial fertilizer, this soil can be profitably cultivated in cotton, corn, sugar cane, oats, Irish and sweet potatoes, cowpeas, and other general farm crops. A good yield of sugar-cane sirup can be secured and it is of superior color and flavor to that produced on the lower-lying, darker-colored types. Pecans, peaches, and pears can be made to yield well, though peach trees are said to be short lived in this region and pears are subject to a destructive blight. The soil is also adapted to heavy late truck crops, such as tomatoes, beans, cabbage, etc. In places this kind of soil is called "cabbage land" because of the large acreage in that crop. Enough hay for home consumption can be produced with cowpeas and certain varieties of grass, but commercially it can not be considered a hay soil. The small acreage of this soil now under cultivation yields fair returns of corn, oats, potatoes, sugar cane, and other crops. A little cotton has been tried with success and an increased acreage is to be planted this year (1909).

This soil will admit of deeper plowing than the more sandy types, and one of the main objects to be kept in mind in its development is a deep, loose seed bed well filled with organic matter. A two-horse plow set for at least 6 inches at first and increasing the depth gradually with each plowing until a depth of 10 or 11 inches is reached, should be used, and the plowing should be followed by thorough working with some improved type of harrow.

The results of mechanical analyses of samples of soil and subsoil of this type are given in the following table:

Mechanical analyses of Norfolk fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20676	Soil	0.0	2.3	9.3	40.5	18.5	24.1	5.4
20677	Subsoil	.1	1.6	7.7	35.3	14.3	21.3	19.9

NORFOLK LOAM.

The surface soil of the Norfolk loam to a depth of 8 or 10 inches is a gray or yellowish-gray fine sandy or silty loam. The fine sandy characteristics are more prominent in areas bordering the more sandy types. Sometimes the sand is so fine that it can scarcely be detected in the silt when the soil is quite wet. Other areas are

heavier, in places almost a light silty clay loam. The subsoil becomes gradually heavier and yellower with depth and is nearly always a pale to bright yellow silty clay below 18 or 24 inches. Occasionally the heavier material is encountered within 1 foot of the surface.

The Norfolk loam is found throughout the area surveyed in a number of small bodies, seldom exceeding 1 square mile in extent. There is more of the type east of the Pascagoula River than west of it.

A level to gently undulating topography is characteristic, but nearby natural drainage courses afford relief from standing water in most instances, and these will serve as outlets for artificial drainage systems where it is advisable to install them. The compact clay subsoil does not allow much movement of the ground water, and tile drains would be found advantageous.

The Norfolk loam is the weathered product of the finer sediments of the Columbia, a marine deposit of Pleistocene age. It has been altered less by erosion than some of the other types. The native vegetation is longleaf and shortleaf pine, which are found in about equal proportions. Wire grass is one of the distinctive species of the smaller plants found on the type. This forms relatively good sod and is valuable for grazing.

This is one of the best general farming soils of the area and should produce very satisfactory yields of cotton, corn, grain, and grass. It is not as well adapted to truck crops as the lighter textured soils, and since it is of limited extent and better adapted to the grains and grasses, which are not usually produced here in sufficient quantities for home consumption, the type can best be utilized for these crops.

Crop rotation is an important feature in the successful management of this soil. Cowpeas will greatly improve it for other crops by their effect upon the soil, even if the vines are cut for hay. Stable and green manures should be used as extensively as possible. The effects of commercial fertilizers will be best for a longer period than in case of the lighter textured types.

The results of mechanical analyses of the soil and subsoil of this type are given in the following table:

Mechanical analyses of Norfolk loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20680	Soil	0.1	0.6	0.4	11.2	29.6	43.9	13.9
20681	Subsoil	.0	.2	.4	8.3	25.0	45.4	20.8

SCRANTON SANDY LOAM.

The soil of the Scranton sandy loam is a dark-gray medium to coarse sand 18 to 24 inches deep. The immediate surface often contains considerable organic matter and the dark color of the soil particles is due to stains by the products of its decay. No explanation as to the cause of this accumulation of organic matter and resulting dark color can be offered. The topographic position and other features apparently should cause the soil to be well drained and this would naturally give it a lighter color. The subsoil is usually a sticky sand or sandy clay of a bright to grayish-yellow color.

The type is found only in a few small areas in the southeast portion of the region west of the Pascagoula River. It usually occupies low ridges and upper slopes or small level areas adjacent to streams. Both surface and subdrainage are apparently well established. The type bears a fair growth of pine but a very meager stand of grass. It is adapted to the same crops as the Norfolk loamy sand and should be handled in the same way.

The average results of mechanical analyses of the soil and subsoil of this type are given in the following table:

Mechanical analyses of Scranton sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20706, 20708.....	Soil.....	0.1	11.6	23.1	38.7	5.5	15.9	4.8
20707, 20709.....	Subsoil.....	.1	14.1	19.9	37.9	4.7	15.2	7.9

SCRANTON FINE SANDY LOAM.

The soil of the Scranton fine sandy loam to a depth of 8 or 10 inches is a dark to very dark gray fine sandy loam. In a few places it contains a high percentage of fine sand and in others there is considerable silt, but the distinguishing feature of the type is its dark color, due in some instances to a high organic content and in others to a dark stain on the soil grains resulting from the decomposition products of the organic matter. The more mucky areas appear very silty upon casual examination, but a careful investigation discloses a relatively high content of very fine sand in such areas. The lighter colored phase grades into the Norfolk series. Below 10 inches the color of the soil usually changes quite rapidly to a yellow or yellowish gray, though under the darker phase it may remain somewhat dark to about 18 inches. The texture becomes heavier with depth and is generally a heavy yellow sandy loam below 18 or 24 inches. The subsoil of the poorer drained areas is often slightly mottled with gray and in one or two instances

there is a slight red mottling. A lighter textured phase, developed mostly in the southwest section of the area, is underlain to a depth of more than 3 feet by pale-yellow heavy sandy loam.

The type is distributed throughout the entire area in irregular-shaped bodies varying in size up to several square miles. The darker colored phase, which was first recognized as a soil distinct from the Norfolk and Portsmouth types, lies mostly on the east side of the Pascagoula River and the darkest portions are mostly in the southern part of that region. The areas west of the river, though sometimes quite dark, are as a rule lighter in both color and texture than those on the east side.

The larger areas of the type are level or very slightly undulating. Smaller bodies occupy either slightly raised positions or partially drained areas adjoining lower lying members of the Portsmouth series or slightly higher lying and better drained Norfolk types. A normal position for this soil is on a very gradual slope between Norfolk types above and the Portsmouth on the lower side. Surface drainage is partially established and when the subsoil is not too heavy there is some subdrainage. The area surveyed is as a whole, however, so level and the underground water table so near the surface that very little opportunity is afforded for the escape of excess water downward. In drainage as in other features the type is intermediate between the corresponding Norfolk and Portsmouth types. This soil is derived from the same marine deposits as the Norfolk and Portsmouth soils, and represents an intermediate condition of drainage. With cultivation it will in time become more like the Norfolk soils.

Longleaf and shortleaf pine in about equal proportions form the principal growth on the forested areas. On open and cleared areas a heavy sod of wire grass is found.

Most of the type must be artificially drained before it can be depended on to produce crops, though some areas will do so in their present condition during favorable seasons. When thoroughly drained, however, it is a stronger soil than the Norfolk fine sandy loam and adapted to the same crops. Cotton, corn, cane, oats, grasses, potatoes, cabbage, and all late truck crops can be grown successfully.

While the characteristic dark color and higher organic matter content give it a decided advantage over the corresponding Norfolk type, these will gradually disappear under the influence of cultivation and drainage. For this reason care should be taken from the beginning to keep up the supply by the use of green and stable manure, just as is recommended in the case of the Norfolk fine sandy loam. Deep plowing and thorough tillage are also necessary in order to

loosen the entire surface material and subject it to thorough aeration so as to have a deep mellow seed bed.

The average results of mechanical analyses of the soil and subsoil of this type are given in the following table:

Mechanical analyses of Scranton fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20710, 20712.....	Soil.....	0.1	1.2	6.9	47.7	17.0	19.7	6.7
20711, 20713.....	Subsoil.....	.0	1.2	7.3	47.1	17.7	18.6	7.8

SCRANTON SILT LOAM.

The surface soil of the Scranton silt loam, to a depth of 6 to 10 inches, is a dark to very dark silt loam or a silty loam with a high content of organic matter and a considerable percentage of very fine sand in places. In some areas the amount of very fine sand is partially obscured by the soft mucky character of the soil when wet, though the true texture is more apparent in a dry sample. In the lighter colored phase the very fine sand is mostly displaced by a higher content of silt, though the difference in texture is not easily detected in the field. As a type it is generally darker colored and has a higher content of organic matter than the Scranton fine sandy loam. Higher lying and better drained areas are lighter colored and grade slowly into the Norfolk loam.

From 10 to 20 inches the subsoil may have a gray or yellow color, but is usually a little dark to a depth of about 18 inches. The texture is a heavy silt loam with some very fine sand where that material is found to some extent in the surface. Below 20 inches the material is a compact, sticky, silty clay, becoming heavier with depth. The color is sometimes a bright yellow, but is more often slightly mottled with gray and brown. In a few cases a little red mottling is found at lower depths.

Most of the type is found in irregular-shaped areas of considerable extent throughout the section east of the Pascagoula River. There are only two or three small areas west of the river. The surface is generally very level, with occasionally a slight slope toward drainage channels or adjacent Swamp and Portsmouth areas. In places the type is slightly undulating, but as a whole it is more level than the Scranton fine sandy loam, and the only types showing less relief are the members of the Portsmouth series. There is little or no underdrainage through the heavy subsoil, though the type lies higher than the Portsmouth soils, and the permanent water table is not near

enough to the surface to have prevented its aeration and weathering into the yellow color characteristic of Norfolk soils. Surface drainage is but poorly established and the type is so flat that over most of its extent a thorough system of artificial drainage is necessary before it can be developed extensively as farming land. Shallow water stands on much of the type for several days after a hard rain, at least during the winter season.

In origin the type is closely related to the Norfolk loam, being derived from the finer sediments of the Columbia formation. The native forest growth is largely shortleaf pine with a little longleaf. It also bears a heavy growth of wire grass.

By thorough drainage this can be made one of the best general farming soils of the area. Its silty texture and relatively high content of organic matter, together with its heavy clay subsoil, render it capable of retaining a larger supply of moisture than most any of the other soils. It is not well adapted to early truck crops, but for the region is an excellent soil for the grasses, small grains, and corn. Cotton and some of the heavier truck crops can also be grown successfully. It is a good soil for dairying, especially where associated with some of the heavier Portsmouth types, which can be used to advantage for pasture. At present it is not so much in need of organic matter as some of the other soils, but drainage and continued cultivation will make it necessary to maintain the supply of organic matter by the use of green and stable manures and by a proper crop rotation. Deep plowing should be practiced. The first 10 inches of soil, which is rich in humus, should be turned and exposed to aeration and weathering. This soil does not respond as quickly to commercial fertilizers as the lighter textured types, but the effects last much longer.

The following table gives the average results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Scranton silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20714, 20716.....	Soil.....	0.2	0.5	0.5	6.4	13.1	67.7	11.6
20715, 20717.....	Subsoil.....	.1	.3	.4	5.2	27.7	50.6	15.5

PORTSMOUTH SANDY LOAM.

The surface soil of the Portsmouth sandy loam, to a depth of 8 or 10 inches, is a dark-brown to almost black light sandy loam with the sand mostly of the medium and fine grades. The loamy character is due largely to a high organic matter content, though there is some silt and clay. Below 10 inches there is less organic matter and the

soil is a dark brownish-gray or reddish-brown light sandy loam or slightly coherent sand, sometimes mottled with gray and pale yellow. The texture becomes lighter and the sand grains coarser with depth. The soil is loose and friable when partly dry. When thoroughly wet it is often soft and boggy.

Soil of this type was mapped only in the southwest portion of the area, where several irregular bodies were found within a few miles of Ocean Springs and between this place and Fontainebleau. All of the soils mapped in that section of the area are somewhat more sandy than is typical. This is true of the Portsmouth fine sandy loam as well as of the others, and the Portsmouth sandy loam is separated from that type by an arbitrary boundary as there is a slow though regular gradation from one type to the other. The surface is flat or slightly depressed and in several places the areas receive the drainage water from the surrounding types. Water finds its way from the surface very slowly as there are few drainage channels, and though the immediate subsoil is loose and pervious there appears to be no ready outlet for the underground water. The water table stands at or near the surface for a large part of the year and the surface is often covered for several days with water 1 to 3 inches deep.

The Portsmouth sandy loam has been formed from the same marine deposits as the soils already described, but subsequently to emergence more swampy conditions have prevailed and weathering has been less active. The native forest growth was mostly pine and a little cypress. A wire grass sod with many varieties of waterloving weeds now occupy the open or cleared areas.

In its present wet condition this soil is of little agricultural use except for the pasturage the wire grass affords. Under present conditions it does not appear to be economical to drain it, unless this be done in connection with a general drainage system covering the entire region. The type has an advantage, however, over a large part of the county in being near the railroad and if thoroughly drained, so as to lower the water table permanently to at least 3 feet, it will be especially adapted to a number of special crops, particularly strawberries. Bulb plants, potatoes, cabbage, lettuce, celery, and other truck crops could also be successfully grown. Notwithstanding the expense of putting the land in good cultivable condition, there can be little doubt that the special crops to which it is well adapted would give profitable returns if proper methods be followed in their production.

PORTSMOUTH FINE SANDY LOAM.

The surface soil of the Portsmouth fine sandy loam is a very dark gray to black fine sandy loam with a high content of organic matter. The sand is mostly of the finer grades. In places the organic matter

content is so high as to mask partially the sandy nature of the material and in such places the surface when wet is soft and mucky. At from 8 to 12 inches, where the organic content becomes less pronounced, the color is a little lighter, often a dark gray or brown. This color often continues beyond 3 feet but in many places it changes to a mottled gray and yellow below 2 feet. The texture of the second foot may sometimes appear a little lighter than the surface because of less organic matter, but ignoring this the mineral matter usually becomes uniformly heavier to a depth of 3 feet. Very rarely a thin layer of compact gray sand is encountered in the lower subsoil. In a few instances, in the south-central part of the area, the lower subsoil is a heavy, plastic, mottled drab, yellow, and red clay.

This type is found in irregular bodies, mostly of limited extent, in all parts of the area. The largest single body is in the southeast corner adjoining the coastal marsh. The larger areas are flat and have no perceptible slope in any direction. Many of the smaller areas occupy slight depressions. There is little natural drainage either on the surface or through the subsoil, and the water slowly seeps from the level surface into shallow adjoining drainage channels or swamps or is dispelled by evaporation.

Agricultural development of this type depends primarily upon its thorough drainage, which, in many cases, must be a part of a general system covering a considerable territory. This question is discussed under "Drainage" in a subsequent part of this report.

The Portsmouth fine sandy loam, like the other types of this series, is derived from the same coastal plain deposit as the Norfolk soils. Many of its characteristics are due to the swampy condition under which it has existed for a long time. It is now in a state midway between true Swamp and that more perfect condition of drainage which have favored the processes of aeration and oxidation resulting in the Norfolk types. The soil is rich in organic matter, which is a valuable factor in its productiveness when drained. Such wet soils are often sour as the result of acids formed by the decay of the vegetable material and one step in the reclamation of such soils should be the heavy application of lime.

The native vegetation consists mainly of a scant growth of shortleaf pine with a considerable though varying quantity of cypress. Of smaller plants wire grass is a prominent species. When thoroughly drained, so as to lower the water table permanently below 3 feet, the type will be well suited to the production of late truck crops, especially cabbage, onions, lettuce, etc. It will also become an excellent soil for late strawberries, and large yields of Irish potatoes should be secured. The latter crop, however, must be planted on very well-drained areas or at a dry time as the seed is liable to rot in a very wet

cold soil. Celery can be produced successfully, especially if irrigated. Tuberose, dahlia, and canna bulbs are raised extensively on this soil type in North Carolina.

The results of mechanical analyses of the soil and subsoil of this type are given in the following table:

Mechanical analyses of Portsmouth fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20694	Soil	0.0	2.6	7.6	24.5	31.5	29.2	4.4
20695	Subsoil	.1	2.6	8.7	22.7	28.0	31.4	6.1

PORTSMOUTH LOAM.

The type mapped as Portsmouth loam covers a range of textures from the heavier phase of the fine sandy loam to the lighter phase of the clay loam of the same series. The various phases, however, would be very difficult to separate and map, especially in the present water-logged condition of the areas, and the separations would not show any material differences in crop adaptation or feasible methods of development. Typical areas to a depth of about 9 inches are a dark-brown to jet-black loam, with a high content of organic matter. The sand content is of the finer grades. The subsoil is a dark-gray or brown loam, carrying less organic matter than the surface, and gradually becoming heavier in texture and lighter in color with depth. At 28 to 30 inches there occurs a mottled drab and yellow heavy loam or sandy clay, and occasionally there is in the lower subsoil a thin layer of compact sand. Extensive areas east of the Pascagoula River have a dark to black, friable, very silty loam surface, with the sand content of finer grades, underlain by a drab silty clay which becomes heavier and more mottled with depth. In certain places the subsoil is a heavy, mottled drab, yellow, and red plastic clay. The lighter textured phase is characterized by a high percentage of fine sand to more than 3 feet; but this is so masked by the high content of organic matter that the resulting loamy characteristic is too pronounced to include it in the lighter textured type. This phase is found mostly west of the Pascagoula River, often adjoining areas of the Portsmouth sandy loam.

Areas of the Portsmouth loam are found throughout the survey, but the greatest development is east of the river. There is a large total area of the silty phase. The larger areas are flat and many of the smaller ones somewhat depressed. Like the Portsmouth fine sandy loam, it is relieved of excess water only by slow seeping away

to levels only slightly lower and by evaporation. While small areas are so situated that they can be artificially drained as a unit, the development of most of the type depends upon the construction of extensive drainage systems.

The mineral material in this soil is a marine deposit which has not yet been sufficiently relieved from a swampy condition to allow the processes of aeration and oxidation to complete the work of soil formation. It is in the same intermediate state, as regards drainage, as the Portsmouth fine sandy loam. The surface soil is amply supplied with organic matter in all stages of decomposition.

In their native condition areas of this soil support a scattering growth of shortleaf pine and considerable cypress, the latter being found especially in narrow, depressed areas where water stands longest. Wire grass forms a heavy sod in the more open areas.

When drained and the water table lowered to at least 3 feet, much of the type will be especially well adapted to celery and in only a slightly less degree to onions. The darker colored more organic phase is best for these crops. Many of the late truck crops can be grown on all of the type. It will also return good yields of corn, sugar cane, grains, etc. Where the drainage is not so complete, fair grass land results. The soil is more compact and more retentive of moisture than the fine sandy loam, and with irrigation rice may be found to be a good crop. When drained, some of the type can be further benefited by a heavy application of lime, but this should not be attempted on the very mucky areas, except in an experimental way, for it might cause too rapid decomposition of the valuable organic matter which the soil contains.

The results of mechanical analyses of the soil and subsoil of the Portsmouth loam are given in the following table:

Mechanical analyses of Portsmouth loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20700	Soil	0.0	0.2	0.1	26.2	23.9	32.8	16.7
20701	Subsoil	.0	.1	.0	25.0	25.8	29.1	20.0

PORTSMOUTH CLAY LOAM.

The surface 6 or 10 inches of the Portsmouth clay loam is a very dark to black clay loam. Below this the texture gets a little heavier and the color changes to a dark brown or drab. At depths of 18 inches to 2 feet it is often a mottled drab and yellow stiff clay. Some areas are a heavy silty clay throughout the soil section. In places a compact layer of light-gray sand is encountered below 2 feet. In

the network of this type among the raised bodies of Norfolk and Scranton fine sandy loam in the northwest corner of the area there are many abrupt changes of texture not indicated by surface appearance and none of them extensive enough to warrant tracing out. There are small areas of fine sandy loam and other textures included in the type here. An area 3 miles northwest of West Pascagoula and another 4 miles northeast of Moss Point are much heavier than the typical soil; both being a heavy slightly silty clay and underlain, at least in part, by a heavy, plastic, mottled drab, yellow, and red clay. The area near the State line southeast of Pecan has a yellow subsoil at about 2 feet, which distinguishes it from other areas.

This type is developed most extensively in the troughlike depressions in the northwest corner of the area. There are a few small areas throughout the region west of the Pascagoula River and three or four bodies of considerable extent east of that stream. In a few instances the surface has nearly the same elevation as adjoining types, but usually it is depressed from 5 to 15 or 20 feet below the surrounding land, though the surface in these depressions is usually flat or slopes almost imperceptibly to the center of the trough, where a shallow stream is often found. The heavy clay subsoil effectually prevents the passage of water downward and many areas are practically imponded, and the water can only seep off slowly by settling along the maze of connecting depressions at a nearly uniform level to some open drainage channel. In both these and the broader flat areas the water may fall to a uniform depth of 1 or 2 inches and then remain until evaporated. With the exception of actual Swamp and Tidal marsh, it occupies the poorest drained portions of the area surveyed.

The mineral material is a quiet-water, marine sediment which has received considerable additions by wash from adjacent lands since the retreat of the sea. Like the other Portsmouth types, it is still in the transitional stage from swamp to fully developed soil. Scattered, irregular, and narrow areas of this type hardly warrant in themselves the expense of adequate drainage. The broader areas are well worth reclaiming, but this will necessitate a comprehensive plan and is not within the power of the individual planters. If such a system shall be installed many smaller areas will also be benefited.

There is a little shortleaf pine on the broader areas and some cypress and other trees in some of the depressions. Much of the type, however, is occupied only by water-loving grasses and weeds.

The Portsmouth clay loam is not adapted to truck or special crops even when drained. The broader areas could be irrigated for rice. Where partially drained the type is one of the best grass soils in the area, and if thoroughly drained it is a strong general farming soil for cotton, corn, grain, etc. The greatest difficulty is in handling

it during a wet season. Deep plowing when the soil is fairly dry, thorough tillage, and the use of green and stable manures to lighten the soil will give the best results. An occasional application of lime will also be beneficial.

The following table gives the average results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Portsmouth clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20702, 20704.....	Soil.....	0.0	0.3	0.8	13.8	12.6	47.8	25.7
20703, 20705.....	Subsoil.....	.0	.2	.9	11.6	11.8	47.4	27.7

ORANGEBURG FINE SANDY LOAM.

The two areas mapped as Orangeburg fine sandy loam present somewhat different phases of the type. As found in the extreme northeast corner of the survey, the soil is a loose or light fine sandy loam having a light-brown or gray color, underlain at from 1 to 2 feet by a red sandy clay. The other body, which lies near the west side of the Pascagoula Swamp at the northern edge of the area, fits this description in a few places; but most of it is a dark reddish-brown, compact, though easily tilled, fine sandy loam. The sand is mostly of the finer grades. The surface few inches holds a little organic matter. At about 6 or 8 inches it changes to the typical red sandy clay subsoil. In both areas the topography is gently rolling, with comparatively level areas on the higher elevations and, in places, ample drainage channels. Nearly the entire type can be easily cultivated as soon as cleared, although there are portions of it which can be benefited by underdrainage. A few of the steeper slopes must be terraced to prevent excessive erosion when plowed.

The Orangeburg fine sandy loam has been derived through weathering and erosion from the red sandy clays of the Lafayette formation. The two small areas encountered here are the most southern extensions of large areas of this soil which lie to the north. The Lafayette formation doubtless underlies much of the area surveyed here, but only in these two places does it approach near enough to the surface to enter largely into the formation of the soil. The soil supports a good growth of pine and other trees.

The Orangeburg fine sandy loam is always considered stronger than similar textured soils with yellow subsoils, like the Norfolk series. It is undoubtedly the best soil in the area for general farm crops, and especially with the generally inadequate drainage conditions obtaining on many of the other soils. In some parts of the South this soil,

with reasonable care, yields two-thirds to three-fourths bale of cotton per acre. Corn will produce 40 or 50 bushels. Sugar cane, potatoes, and cowpeas and other hay crops are adapted to the type. On the more sandy phases truck crops will do well. It is the best peach soil in the area.

Deep plowing, increasing the depth not more than 1 inch each year until an ultimate depth of not less than 10 inches is attained, and thorough tillage, with the liberal use of green and stable manure, are essential to maintain this soil in a high state of productiveness.

The results of mechanical analyses of soil and subsoil of this type are given in the following table:

Mechanical analyses of Orangeburg fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
20686	Soil	0.0	0.8	2.4	32.0	23.3	29.3	12.2
20687	Subsoil	.0	.4	1.9	28.2	19.9	28.3	21.4

MUCK.

This is one of the three divisions into which the wetter, more swampy portions of the area have been separated. It includes only such areas as were partly accessible to examination, though there are known to be bodies of the same material included in the areas mapped as Swamp, but so inaccessible that it was not practicable to attempt a more detailed classification.

The surface material, to a depth of more than 2 feet, and in most places to more than 4 feet, is a black to dark-brown muck. There is a little included mineral matter, but the body of the material consists very largely of organic matter in all stages of decomposition. This surface layer may be underlain by a stiff plastic clay or a compact sandy hardpan, but always by some impervious material. The largest body of Muck occupies the Black Creek Swamp in the northern part of the region east of the Pascagoula River. There are also several less extensive swamps, and many small slightly depressed areas in the uplands, locally known as "ti-tis," which are occupied by Muck. The name "ti-ti" is taken from the heavy thicket of ti-ti shrubs which occupy such areas. Many of these ti-ti swamps were too small to show on the map. No Muck was mapped west of the river.

Muck occupies depressed areas with so little drainage that the surface is under water for months at a time and the soil material never thoroughly dries out. The larger areas, however, have a

natural outlet through a main stream channel now clogged by soil and trees, and drainage can be readily accomplished by cleaning out and deepening these channels as an outlet for minor laterals. In some cases, at least, the main stream outlet is the principal natural drainage way of the region, covering all the adjoining soils so that the reclamation of the Muck areas can be accomplished as a part of a general drainage system.

Muck owes its origin to wet swampy conditions and consequent accumulation and slow decay of organic matter, mixed with a little silt and sand washed in each year from the surrounding soils. It is one of the most recent formations in the area and is still in process of accumulation.

It is loose, friable, retentive of moisture, and, when well drained to a depth of 2 or 3 feet, is especially adapted to certain special crops. In its present condition, however, it has practically no agricultural value. It bears some pine and cypress and other water-loving trees. Because of the almost impenetrable undergrowth of shrubs and vines the clearing of this land will be an important item in the cost of reclamation.

When drained and cleared, Muck is one of the best celery soils in the country, and will produce excellent yields of a very crisp and high-quality crop. Large yields of onions, cabbage, Irish potatoes, beets, and other root crops, and corn can also be secured.

The soil is rich in nitrogen and does not require much of this fertilizer, though a light application in a readily available form might be of benefit. It is deficient, however, in phosphoric acid and potash and should respond readily to applications of both. In many places Muck soils formerly considered worthless have been developed into the highest-priced lands of the region and the larger areas here are without doubt well worth reclamation.

When Muck areas adjoin the light-colored sandy and sandy loam soils lacking in organic matter it is sometimes feasible to haul Muck on the land and plow it under the same as manure. Besides adding nitrogen, in which such soils are deficient, it will also improve the water-holding capacity of the soil.

SWAMP.

The area mapped as Swamp is that portion of the permanently wet lands occupied by a tree growth as distinguished from the Tidal marsh which bears only coarse grass. The Swamp is also at a slightly greater elevation. There is no prevailing type of soils in these areas. In places it is a typical cypress swamp with a thick stand of cypress and other water-loving trees and is under water much of the time. In other places there is some pine, and in still others a heavy undergrowth of shrubs and vines. The areas thus mapped were mostly

inaccessible at the time the field work was done because of overflow water, and during the drier months the rank vegetation would bar passage into much of it. Most of the type is subject to annual overflow, and will not warrant reclamation until the higher land in the area is all under cultivation and diking is employed to reclaim the remaining areas. It is known that there are considerable areas included in this type, notably in the northern portion of the Pascagoula Swamp, which can be cultivated during the dry months and will give excellent yields of corn and other crops. The soil in such areas is usually a brown clay loam underlain by a drab clay mottled with yellow. The upper Dog River Swamp is known to contain some sandy hammock land, but this, like the other areas, is rather inaccessible in its present condition.

Most of the Swamp occurs along the upper portion of the Pascagoula River and all but the first few miles of Dog River, though a little of it is found along minor streams. It merges gradually into the Tidal marsh and no attempt was made to locate definitely the boundaries between them. The Swamp is permeated with a maze of bayous, sloughs, streams, and ponds.

TIDAL MARSH.

The Tidal marsh is the low flat region bordering most of the channels as far back as there is any influence of the tides and most of it is true salt marsh. The largest area is the Pascagoula Marsh, which is about 4 miles wide and extends 9 miles back from the coast near the center of the county east and west. One arm borders Dog River for a short distance and another extends along Bluff Creek nearly to Vancleave. The next largest area is along the coast at the southeast corner of the county. There are numerous smaller areas along Old Fort Bayou and other tidal channels. It merges gradually into Swamp and no definite boundary is established between them. The surface is flat and much of it stands within the limits of high and low tide levels, so that it is periodically overflowed with salt water of decreasing concentration with distance back from the coast. The soil is a sticky mud, probably a clay loam, and is seldom if ever dried out even on the surface. The material is a recent sediment which is still in process of deposition, and the type represents the first stage in the formation of a soil from a coastal deposit. It is occupied by a coarse grass which is useless for feed or pasturage. It can be reclaimed only by diking, which is not warranted at present under the existing conditions of settlement in the region and ruling prices of land. Much of it is public land open to homestead but it is not likely to be taken up for a long time.

DRAINAGE.

The question of drainage is of paramount importance to the Scranton area. With the exception of some of the deep, loose sandy types of the Norfolk series, all the soils in the survey would be benefited, at least in places, by artificial drainage, and there are large areas, comprising several different types of soil, where an extensive drainage system is the first requisite for agricultural development. The Muck, all of the Portsmouth series of soils, and that portion of the Scranton series occupying large level areas are so poorly drained that water stands on the surface for long periods. The reclamation of such areas is not a problem that can be solved satisfactorily for each farm by itself, as most of them have no convenient outlet for the drainage water. In general, only the farms bordering the coast or the larger swamps and streams can be drained individually.

The surface is so nearly level that in the construction of a general drainage system the location of main canals and oftentimes of the laterals will require skillful engineering. No plan has as yet been worked out and therefore no details can be given here. A contour map with narrow intervals or at least carefully run levels in several directions will be necessary in many instances. Some of the main canals will need to be of considerable capacity. It is probable that in many cases shallow bayous can be utilized by deepening and straightening them, but in others it will probably be necessary to cut new channels for long distances. The lateral drainage into these main channels can be accomplished either by open ditches or tile underdrains. In many cases a somewhat extensive subsystem with open mains to the large canals and tile laterals will be advisable on each farm. The water table, which now stands at or near the surface of many of the soils, must be lowered at least 18 inches or 2 feet before the land can be utilized at all successfully, and in many cases it must be lowered 3 feet before the land can be depended upon to produce satisfactory crops.

There are two or three suggestions regarding the drainage problem which may be in place here. They are derived from the practice in other places and are applicable to this area. As already mentioned, the land to which this chapter applies can not be drained conveniently as individual farms, and the problem is therefore one that must be solved by the community. In some sections the State or county constructs the main system of canals and is reimbursed by receipts from a special drainage tax on the land benefited. This provides the general outlet for the drainage waters and leaves only the lateral systems on each farm to be constructed by the owner.

Another plan is the organization of a drainage company to take over the land covered by one or more projects and institute the entire drainage system, including main canals and all the laterals. This

can best be done on a cooperative plan by the owners themselves, provided there are enough of them owning land which can be included in one project. Much of the land is now owned in large tracts by individuals and lumber companies, who, having cleared it of timber, now wish to sell the land rather than to develop it for agriculture.

Many of the more rolling areas of Scranton soils and considerable areas of some of the Norfolk types, which would not by themselves require the extensive drainage system suggested above, lie within or adjacent to the regions which do need such systems, and such areas can easily be included as subordinate divisions of the main projects with a less detailed system of minor ditches. Most of the areas of Norfolk types and all of the Orangeburg soils which need drainage are situated so near stream ways or eroded channels that the land can be drained directly into them.

SUMMARY.

The Scranton area comprises 470 square miles in the southern part of Jackson County, Miss. It is in general flat and poorly drained, but there is more relief in the northern part, where the highest point is about 35 feet above sea level.

All the drainage water finds its way into the Mississippi Sound through the Pascagoula River and other streams.

The area is very sparsely populated, except along the east side of the Pascagoula River for a distance of 5 miles from the coast.

The summers are long and hot and the winters very mild. The rainfall is extremely variable at all seasons, but the average is higher than for most of the United States, the annual mean being about 61 inches.

Less than 5 per cent of the land is in cultivation, and agriculture is just beginning to attract attention. Some general farm crops are raised, but the agricultural future of the area depends largely upon trucking and other special industries, among which the growing of pecans promises to be important.

The main soil types belonging in the Norfolk, Scranton, and Portsmouth series are derived from the Columbia formation. The Norfolk soils are best drained and most fully developed so far as weathering is concerned. The Portsmouth soils are in a wet condition, which has prevented complete weathering and favored the accumulation of organic matter, thus giving them a dark color. The Scranton soils are intermediate between the other two series in all of their characteristics.

The Norfolk sand is a poor general farming soil, but is especially adapted to melons and very early truck crops, which mature earlier on this than on any of the other soils.

The Norfolk loamy sand differs from the Norfolk sand only in having a heavier subsoil. It is adapted to the same crops, but will not

generally mature them quite as early. It is naturally somewhat more productive.

The Norfolk fine sand is among the best soils for early truck crops, berries, and bush fruits.

The Norfolk fine sandy loam is one of the general farming types of the area. Being better drained than most of the types occupying a large area, it can be more readily developed than most of them and will yield satisfactory returns in cotton, corn, cane, potatoes, and other general farm crops. It is adapted to some of the heavier truck like cabbage. Pecans and tree fruits do well.

The Norfolk loam is a poor truck soil, but is a good type for grain, grass, cotton, and other general farm crops.

The Scranton sandy loam is very similar to the Norfolk loamy sand, except in color, which is darker, and is adapted to the same early truck crops.

The Scranton fine sandy loam, if drained, is a stronger soil than the Norfolk fine sandy loam and is adapted to the same crops. Cotton, corn, grass, cabbage, potatoes, etc., will do well on drained areas.

The Scranton silt loam needs drainage, but when this is supplied it will prove an excellent grass and grain soil. Cotton can also be grown successfully. Some of the late truck crops can be produced on the areas containing much organic matter.

All of the Portsmouth types are badly in need of drainage, but when properly drained are well suited to certain crops. The sandy loam is well adapted to strawberries, flower bulbs, lettuce, celery, and other truck; the fine sandy loam is well suited to late crops, flower bulbs, strawberries, etc.; the loam is a good general farming soil, and that phase of it with high organic matter content is excellent for late truck crops, especially celery and lettuce. The clay loam is not adapted to truck crops, but is a strong grass and grain soil.

The Orangeburg fine sandy loam is of limited extent, but is an excellent cotton and corn soil. Late truck crops can be produced on the more sandy phase.

Muck in its present condition, with standing water at or near the surface, is of no practical value, but when thoroughly drained it is one of the best known soils for celery and lettuce. It is also adapted to onions, cabbage, root crops, etc.

The Swamp is low, flat, overflow land covered with a heavy growth of trees and underbrush. Most of it is not accessible to cultivation at present, though small, higher lying areas are occasionally planted in corn. It is only a few feet above sea level.

The Tidal marsh is flat, tide-level land occupied only by coarse grass. It is available for cultivation only after diking, and none of it is now in use.

The agricultural development of a large part of the area depends primarily upon the construction of extensive drainage systems.

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MILTON WHITNEY, CHIEF

SOIL MAP

MISSISSIPPI
SCRANTON SHEET

SOIL PROFILE
(3 feet deep)

Norfolk sand — S, S
Norfolk fine sand — Fs, Fs
Norfolk loamy sand — S, Sc
Norfolk fine sandy loam — Fsl, Sl, Sc
Norfolk loam — Sil, Sil, Sic
Scranton sandy loam — Cs, Sl
Scranton fine sandy loam — Fsl, Fsl, Hsl
Scranton silt loam — Sil, Hsil, Sic
Portsmouth sandy loam — Sl, Sl
Portsmouth fine sandy loam — Fsl, Fsl
Portsmouth loam — L, L, Hl
Portsmouth clay loam — Cl, Cl, C
Orangeburg fine sandy loam — Fsl, Sc

LEGEND

S Sand
Sc Sandy clay
Fs Fine sand
Fsl Fine sandy loam
Sl Sandy loam
Sil Silt loam
Sic Silty clay
Cs Coarse sand
Hsl Heavy sandy loam
Hsil Heavy silt loam
L Loam
Hl Heavy loam
Cl Clay loam
C Clay

LEGEND

Norfolk sand — N
Norfolk fine sand — Nf
Norfolk loamy sand — Ns
Norfolk fine sandy loam — Nsl
Norfolk loam — Nl
Scranton sandy loam — S
Scranton fine sandy loam — Sl
Scranton silt loam — Ss
Portsmouth sandy loam — Psl
Portsmouth fine sandy loam — Ps
Portsmouth loam — Pl
Portsmouth clay loam — Pc
Orangeburg fine sandy loam — Os
Muck — M
Swamp — Sw
Tidal marsh — T

Wade
Arena
Three Rivers
Vancleave
Fort Bayou
Ocean Springs
Fontainebleau
West Pascagoula
Escatawpa
Moss Point
Pecan
Orange Grove
Gautier
Pascagoula
Spanish Pr.
Greenwoods Pt.
Pt. aux Chenes
Bayou Casotte
Belle Fontaine Point
Plummers Pt.
HARRISON COUNTY
JACKSON COUNTY
BOUNDARY LINE
ALABAMA MISSISSIPPI STATE
BACK BAY OF BILOXI
BILOXI BAY
DEER ISLAND
LES GRANDES ISLES
ROUND ISLAND
HORN ISLAND
PETITBOIS ISLAND
PT. AUX CHENES BAY
MISSISSIPPI SOUND
GULF OF MEXICO
Pascagoula River
West Pascagoula River
Escatawpa River
Dog River
Bluff Creek
Ocean Springs Creek
Old Fort Bayou
Davis Bayou
Graveline Bayou
Dennis Bayou
Lake Catch-em-all
Fowls Lake
Point Clear Lake
Pierces Bayou
Franklin Creek
Jackson Creek
Bayou Chamier
Bayou La Batre
Bayou Casotte
Louisville and Nashville R.R.
Mobile and Ohio R.R.
New Orleans and Ohio R.R.
Gulf and Ship Island R.R.
88°50'
45'
40'
35'
30'
88°25'
30°35'
30°
30°15'
25'
20'

Soils surveyed by
Ora Lee Jr. Risden
T. Allen, and R. A. Winston
1909

Scale 1 inch = 1 mile

A. Hoen & Co. Lith. Baltimore, Md.

Field Operations
Bureau of Soils
1909